IN THE CLAIMS

1. (Withdrawn) A flame retardant polymer composition comprising:

a polymer material; and

a polycondensation product of a plurality of monomers of an at least partially hydrolyzed, phosphinate-chelated metal oxide precursor.

2. (Withdrawn) The flame retardant polymer composition of claim 1, wherein said polymer material comprises at least one of an alkyd resin, a vinyl ester resin, a polyurethane resin, an epoxy resin, a phenol resin, an urea-aldehyde resin, a polyvinyl aromatic, a maleimide resin, a polyvinyl halide resin, a polyolefin, a polyorganosiloxane, an amino resin, a polyamide, a polyimide, a polyetherimide, a polyphenylene sulfide resin, an aromatic polysulfone, a polyamideimide, a polyesterimide, a polyesteramideimide, a polyvinyl acetal, a fluorinated polymer, and a polycarbonate.

3. (Withdrawn) The flame retardant polymer composition of claim 1, wherein each of said plurality of monomers of said at least partially hydrolyzed, phosphinate-chelated metal oxide precursor comprises at least one of a transition metal, an alkaline earth metal and a metallic element selected from the group comprising Groups 3A, 4A and 5A of the periodic table of elements.

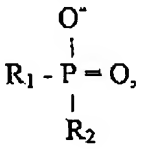
4. (Withdrawn) The flame retardant polymer composition of claim 3, wherein each of said plurality of monomers of said at least partially hydrolyzed, phosphinate-chelated metal oxide precursor comprises at least one of aluminum, antimony, bismuth, calcium, chromium, magnesium, tin, titanium, zinc, and zirconium.

5. (Withdrawn) The flame retardant polymer composition of claim 1, further comprising at least one of a fire retardant additive, a blowing agent, a fibrous reinforcing material, a pigment, a mold release agent, a thermoplastic polymeric material, an elastomeric

polymeric material, a shrink control agent, a wetting agent, an antifoam agent, a surface treatment agent, and a thickener.

6. (Withdrawn) The flame retardant polymer composition of claim 1, wherein said polycondensation product comprises nano-clusters of said monomers of said at least partially hydrolyzed phosphinate-chelated metal oxide precursor, said nano-clusters having an average diameter of about less than 100 nm.

7. (Withdrawn) The flame retardant polymer composition of claim 1, wherein each of said plurality of monomers of said at least partially hydrolyzed, phosphinate-chelated metal oxide precursor comprises an anion having the formula:



wherein R_1 and R_2 are selected from the group of moieties comprising an alkyl, an aryl, an alkoxy and an aryloxy moiety.

8. (Withdrawn) The flame retardant polymer composition of claim 1, wherein each of said plurality of monomers of said at least partially hydrolyzed, phosphinate-chelated metal oxide precursor comprises a phosphinate anion derived from phosphinic acid.

9. (Withdrawn) The flame retardant polymer composition of claim 1, wherein each of said plurality of monomers of said at least partially hydrolyzed, phosphinate-chelated metal oxide precursor comprises a diphenylphosphinate anion.

10. (Withdrawn) The flame retardant polymer composition of claim 1, wherein said polycondensation product is present in the flame retardant polymer composition in an amount in the range of about 0.1% to about 50.0% by weight of flame retardant polymer composition.

11. (Original) A process for making a phosphorous-containing metal oxide sol comprising the steps of:

contacting a metal oxide precursor with a source of organophosphinate anions to form a phosphinate-chelated metal oxide precursor;

at least partially hydrolyzing said phosphinate-chelated metal oxide precursor to form at least partially hydrolyzed phosphinate-chelated metal oxide precursor monomers; and

permitting said at least partially hydrolyzed, phosphinate-chelated metal oxide precursor monomers to polycondense to form a phosphorous-containing metal oxide sol comprising a liquid and a polycondensation product of said at least partially hydrolyzed phosphinate-chelated metal oxide precursor monomers.

12. (Original) The process for making a phosphorous-containing metal oxide sol of claim 11, the process further comprising the step of contacting said phosphinate-chelated metal oxide precursor with a polymer material before the step of at least partially hydrolyzing said phosphinate-chelated metal oxide precursor.

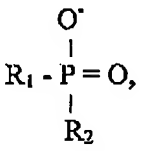
13. (Original) The process for making a phosphorous-containing metal oxide sol of claim 11, further comprising the step of contacting said phosphorous-containing metal oxide sol with a polymer material.

14. (Original) The process for making a phosphorous-containing metal oxide sol of claim 11, wherein the step of contacting a metal oxide precursor with a source of organophosphinate anions comprises selecting said metal oxide precursor from the group comprising at least one of a transition metal, an alkaline earth metal and a metallic element selected from Groups 3A, 4A and 5A of the periodic table of elements.

15. (Original) The process for making a phosphorous-containing metal oxide sol of claim 14, wherein said step of selecting said metal oxide precursor comprises selecting said metal oxide precursor from the group of metal oxide precursors comprising at least one of

aluminum, antimony, bismuth, calcium, chromium, magnesium, tin, titanium, zinc, and zirconium.

16. (Original) The process for making a phosphorous-containing metal oxide sol of claim 11, wherein the step of contacting a metal oxide precursor with a source of organophosphinate anions comprises contacting said metal oxide precursor with a source of anions having the formula:



where R_1 and R_2 are selected from the group of moieties comprising an alkyl, an aryl, an alkoxy and an aryloxy moiety.

17. (Original) The process for making a phosphorous-containing metal oxide sol of claim 16, wherein the step of contacting a metal oxide precursor with a source of organophosphinate anions comprises contacting said metal oxide precursor with a phosphinic acid.

18. (Original) The process for making a phosphorous-containing metal oxide sol of claim 17, wherein the step of contacting said metal oxide precursor with a phosphinic acid comprises contacting said metal oxide precursor with diphenylphosphinic acid.

19. (Original) The process for making a phosphorous-containing metal oxide sol of claim 11, wherein the step of at least partially hydrolyzing said phosphinate-chelated metal oxide precursor comprises the step of contacting said phosphinate-chelated metal oxide with a hydrolyzing agent.

20. (Original) The process for making a phosphorous-containing metal oxide sol of claim 19, wherein the step of at least partially hydrolyzing said phosphinate-chelated metal

oxide precursor comprises the step of contacting said phosphinate-chelated metal oxide with de-ionized water.

21. (Original) The process for making a phosphorous-containing metal oxide sol of claim 11, further comprising the step of removing said liquid from said phosphorous-containing metal oxide sol.

22. (Original) A process for making a flame retardant polymer composition comprising the steps of:

contacting a metal oxide precursor with a source of organophosphinate anions to form a phosphinate-chelated metal oxide precursor;

at least partially hydrolyzing said phosphinate-chelated metal oxide precursor to form at least partially hydrolyzed phosphinate-chelated metal oxide precursor monomers;

permitting said at least partially hydrolyzed, phosphinate-chelated metal oxide precursor monomers to polycondense to form a phosphorous-containing metal oxide sol;

contacting said phosphorous-containing metal oxide sol with a polymer material to form a mixture; and

at least one of polymerizing and solidifying said mixture.

23. (Original) The process for making a flame retardant polymer composition of claim 22, wherein said phosphorous-containing metal oxide sol comprises a liquid and a polycondensation product of said at least partially hydrolyzed phosphinate-chelated metal oxide precursor monomers, and the process further comprises the step of removing said liquid before the step of contacting said phosphorous-containing metal oxide sol with a polymer material.

24. (Original) The process for making a flame retardant polymer composition of claim 22, wherein said phosphorous-containing metal oxide sol comprises a liquid and a polycondensation product of said at least partially hydrolyzed phosphinate-chelated metal oxide precursor monomers, and the process further comprises the step of removing said liquid after the step of contacting said phosphorous-containing metal oxide sol with a polymer material.

25. (Original) The process for making a flame retardant polymer composition of claim 22, wherein said phosphorous-containing metal oxide sol comprises a liquid and a polycondensation product of said at least partially hydrolyzed phosphinate-chelated metal oxide precursor monomers, and the process further comprises the step of removing said liquid after the step of at least one of polymerizing and solidifying said mixture.

26. (Original) The process for making a flame retardant polymer composition of claim 22, wherein the step of contacting a metal oxide precursor with a source of organophosphinate anions comprises the step of selecting said metal oxide precursor from the group comprising at least one of a transition metal, an alkaline earth metal and a metallic element selected from Groups 3A, 4A and 5A of the periodic table of elements.

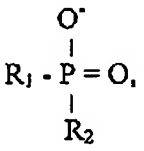
27. (Original) The process for making a flame retardant polymer composition of claim 26, wherein the step of selecting said metal oxide precursor comprises selecting said metal oxide precursor from the group of metal oxide precursors comprising at least one of aluminum, antimony, bismuth, calcium, chromium, magnesium, tin, titanium, zinc and zirconium.

28. (Original) The process for making a flame retardant polymer composition of claim 22, the process further comprising, before the step of at least one of polymerizing and solidifying said mixture, the step of contacting said mixture with at least one ingredient selected from the group comprising a flame retardant additive, a blowing agent, a fibrous reinforcing material, a pigment, a mold release agent, a thermoplastic polymeric material, an elastomeric polymeric material, a shrink control agent, a wetting agent, an antifoam agent, a surface treatment agent, and a thickener.

29. (Original) The process for making a flame retardant polymer composition of claim 22, the process further comprising the step of contacting said phosphorous-containing metal oxide sol with at least one ingredient selected from the group comprising a flame

retardant additive, a blowing agent, a fibrous reinforcing material, a pigment, a mold release agent, a thermoplastic polymeric material, an elastomeric polymeric material, a shrink control agent, a wetting agent, an antifoam agent, a surface treatment agent, and a thickener.

30. (Original) The process for making a flame retardant polymer composition of claim 22, wherein the step of contacting a metal oxide precursor with a source of organophosphinate anions comprises selecting said source of organophosphinate anions from the group of materials that derive anions having the formula:



wherein R_1 and R_2 are selected from the group of moieties comprising an alkyl, an aryl, an alkoxy and an aryloxy moiety.

31. (Original) The process for making a flame retardant polymer composition of claim 22, wherein the step of contacting a metal oxide precursor with a source of organophosphinate anions comprises selecting said source of organophosphinate anions from the group comprising phosphinic acids.

32. (Original) The process for making a flame retardant polymer composition of claim 22, wherein the step of contacting a metal oxide precursor with a source of organophosphinate anions comprises contacting said metal oxide precursor with diphenylphosphinic acid.

33. (Original) The process for making a flame retardant polymer composition of claim 22, wherein the step of at least partially hydrolyzing said phosphinate-chelated metal oxide precursor comprises the step of contacting said phosphinate-chelated metal oxide precursor with a hydrolyzing agent.

34. (Original) The process for making a flame retardant polymer composition of claim 33, wherein the step of contacting said phosphinate-chelated metal oxide precursor with a hydrolyzing agent comprises contacting said phosphinate-chelated metal oxide precursor with de-ionized water.

35. (Original) The process for making a flame retardant polymer composition of claim 22, wherein the step of contacting said phosphorous-containing metal oxide sol with a polymer material comprises contacting said phosphorous-containing metal oxide sol with a polymer material selected from the group comprising at least one of an alkyd resin, a vinyl ester resin, a polyurethane resin, an epoxy resin, a phenol resin, an urea-aldehyde resin, a polyvinyl aromatic, a maleimide resin, a polyvinyl halide resin, a polyolefin, a polyorganosiloxane, an amino resin, a polyamide, a polyimide, a polyetherimide, a polyphenylene sulfide resin, an aromatic polysulfone, a polyamideimide, a polyesterimide, a polyesteramideimide, a polyvinyl acetal, a fluorinated polymer, and a polycarbonate.

36. (Original) The process for making a flame retardant polymer composition of claim 22, further comprising the step of contacting said metal oxide precursor with a solvent before the step of contacting said metal oxide precursor with a source of organophosphinate anions.

37. (Original) The process for making a flame retardant polymer composition of claim 36, wherein the step of contacting said metal oxide precursor with a solvent comprises the step of selecting said solvent from the group comprising water, alcohols, and glycols.

38. (Original) A process for making a flame retardant polymer composition, the process comprising:

contacting a metal oxide precursor with a source of organophosphinate anions to form a phosphinate-chelated metal oxide precursor;

contacting said phosphinate-chelated metal oxide precursor with a polymer material;

at least partially hydrolyzing said phosphinate-chelated metal oxide precursor to form at least partially hydrolyzed phosphinate-chelated metal oxide precursor monomers;

permitting said at least partially hydrolyzed, phosphinate-chelated metal oxide precursor monomers to polycondense to form a phosphorous-containing metal oxide sol; and

at least one of polymerizing and solidifying said polymer material.

39. (Original) The process for making a flame retardant polymer composition of claim 38, wherein said phosphorous-containing metal oxide sol comprises a liquid and a polycondensation product of said at least partially hydrolyzed phosphinate-chelated metal oxide precursor monomers, and the process further comprises the step of removing said liquid before the step of at least one of polymerizing and solidifying said polymer material.

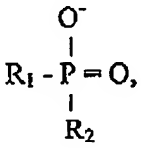
40. (Original) The process for making a flame retardant polymer composition of claim 38, wherein said phosphorous-containing metal oxide sol comprises a liquid and a polycondensation product of said at least partially hydrolyzed phosphinate-chelated metal oxide precursor monomers, and the process further comprises the step of removing said liquid after the step of at least one of polymerizing and solidifying said polymer material.

41. (Original) The process for making a flame retardant polymer composition of claim 38, wherein the step of contacting a metal oxide precursor with a source of organophosphinate anions comprises the step of selecting said metal oxide precursor from the group of metal oxide precursors comprising at least one of a transition metal, an alkaline earth metal and a metallic element selected from Groups 3A, 4A and 5A of the periodic table of elements.

42. (Original) The process for making a flame retardant polymer composition of claim 41, wherein the step of selecting said metal oxide precursor comprises selecting said metal oxide precursor from the group of metal oxide precursors comprising at least one of aluminum, antimony, bismuth, calcium, chromium, magnesium, tin, titanium, zinc and zirconium.

43. (Original) The process for making a flame retardant polymer composition of claim 38, the process further comprising the step of contacting said phosphorous-containing metal oxide sol with at least one ingredient selected from the group comprising a flame retardant additive, a blowing agent, a fibrous reinforcing material, a pigment, a mold release agent, a thermoplastic polymeric material, an elastomeric polymeric material, a shrink control agent, a wetting agent, an antifoam agent, a surface treatment agent, and a thickener.

44. (Original) The process for making a flame retardant polymer composition of claim 38, wherein the step of contacting a metal oxide precursor with a source of organophosphinic anions comprises the step of selecting said source of organophosphinic anions from the group of materials that derive anions having the formula:



wherein R_1 and R_2 are selected from the group of moieties comprising an alkyl, an aryl, an alkoxy and an aryloxy moiety.

45. (Original) The process for making a flame retardant polymer composition of claim 38, wherein the step of contacting a metal oxide precursor with a source of organophosphinate anions comprises the step of selecting said source of organophosphinate anions from the group comprising phosphinic acids.

46. (Original) The process for making a flame retardant polymer composition of claim 45, wherein the step of contacting a metal oxide precursor with a source of organophosphinate anions comprises contacting said metal oxide precursor with diphenylphosphinic acid.

47. (Original) The process for making a flame retardant polymer composition of claim 38, wherein the step of at least partially hydrolyzing said phosphinate-chelated metal

oxide precursor comprises the step of contacting said phosphinate-chelated metal oxide precursor with a hydrolyzing agent.

48. (Original) The process for making a flame retardant polymer composition of claim 47, wherein the step of contacting said phosphinate-chelated metal oxide precursor with a hydrolyzing agent comprises contacting said phosphinate-chelated metal oxide precursor with de-ionized water.

49. (Original) The process for making a flame retardant polymer composition of claim 38, wherein the step of contacting said phosphinate-chelated metal oxide precursor with a polymer material comprises contacting said phosphinate-chelated metal oxide precursor with a polymer material selected from the group comprising at least one of an alkyd resin, a vinyl ester resin, a polyurethane resin, an epoxy resin, a phenol resin, an urea-aldehyde resin, a polyvinyl aromatic, a maleimide resin, a polyvinyl halide resin, a polyolefin, a polyorganosiloxane, an amino resin, a polyamide, a polyimide, a polyetherimide, a polyphenylene sulfide resin, an aromatic polysulfone, a polyamideimide, a polyesterimide, a polyesteramideimide, a polyvinyl acetal, a fluorinated polymer, and a polycarbonate.

50. (Original) The process for making a flame retardant polymer composition of claim 38, further comprising the step of contacting said metal oxide precursor with a solvent before the step of contacting said metal oxide precursor with a source of organophosphinate anions.

51. (Original) The process for making a flame retardant polymer composition of claim 50, wherein the step of contacting said metal oxide precursor with a solvent comprises the step of selecting said solvent from the group comprising water, alcohols, and glycols.